Puget Sound Steelhead Recovery Team
June 5, 2015 Meeting Summary

Actions and Decisions from Meeting

Decision
Accepted April 28 meeting summary as final, with edits.

Action	Assignment
1. Finalize the April 28 meeting summary with edits.	Claire Chase
2. Schedule a conference call for the Recovery Team to discuss next steps from marine survival research projects.	Elizabeth Babcock & Claire Chase
3. Finalize August work session agenda.	Elizabeth Babcock & Claire Chase
4. Add Alan Chapman to Stresses & Pressures Workgroup.	

Welcome & Introductions – Elizabeth Babcock from the National Marine Fisheries Service (NMFS) welcomed the Puget Sound Steelhead Recovery Team ("Recovery Team") and led introductions (*please see end for a list of participants*). There was a slight modification to the agenda since Steve Leider offered to give an update on hatcheries.

April 28 Meeting Summary – The Team reviewed the draft April 28th meeting summary. The Nooksack representative requested to modify the language regarding the EDT model to indicate that the reason Nooksack did not have as much success with EDT as other watersheds is because they did not have a license to go into depth with the model and because Chinook are big river fish which do not perfectly match the Nooksack watershed. With these changes to the draft meeting summary, the Team accepted this version as final.

Hatchery Update – Steve Leider updated the Team on the process that NMFS is leading for steelhead hatcheries around the Puget Sound. Points and discussion included:

- About a year ago, NMFS released one Draft Environmental Impact Statement (DEIS) for all salmon and steelhead hatchery programs in the Puget Sound. Several comments made during the public comment period noted that having assessments for individual hatchery programs would be better than one huge EIS for all programs.
- NMFS withdrew the large DEIS and has taken the individual watershed approach. The first few to move along are the Elwha and Dungeness hatchery programs. The Elwha EIS is complete while the Dungeness EIS is nearly complete.
- There was some confusion when NMFS withdrew the large DEIS so they are working with people to help them understand that that approach is no longer current; and now the focus will be a separate assessment for each hatchery program.
- Three early winter steelhead hatchery programs were included in a draft steelhead package (for the Dungeness, Stillaguamish, and Nooksack watersheds). This package went out for an Environmental Assessment (EA), not an EIS – meaning a slightly different public process that means fewer public meetings and no public scoping.

  - If they had found no significant impact earlier this year, they could have released the fish this spring from the hatcheries. But they received more comments on the EA package than they got on the DEIS. NMFS will likely decide to move forward with a full EIS analysis for these three hatchery programs.
  - This means that there will be more public review with public workshops this summer. NMFS will work with the co-managers to determine whether that analysis will include more than those three hatchery programs. It was unknown at the meeting when the public workshops will be scheduled, but it was noted that the purpose of the workshops will be for scoping and general education.
  - NMFS's goal is to complete the draft EIS in advance of next spring so they know whether or not to release fish from the hatcheries next year.
- The specific timeline for this work is unknown due to NMFS's backlog of review and approval requests for all salmon and steelhead programs in Puget Sound. They will be working with the co-managers to prioritize workload.
- The original DEIS for all salmon and steelhead programs is no longer valid as a NEPA decision document, but is still available as a comprehensive environmental report. It will likely influence future work on other programs.
- Some commenters in the original public comment period noted the lack of a recovery plan for Puget Sound steelhead.
  - The Team discussed that this is somewhat of a chicken-and-egg situation because the Recovery Plan would influence the EIS and vice versa, though both are currently in development so the relationship is unclear at this point.
- Several Team members noted that NMFS's timeline to have the full EIS done by early next winter/spring seems ambitious. NMFS recognized that but remained confident to reach that goal.
- The Team discussed USFWS's increased requests on bull trout hatchery operations and the need for Biological Assessments on those programs. It was noted that many co-managers who work on steelhead also work on bull trout, and this increased workload on bull trout may impact the ability to keep up with steelhead work.
- The draft implementation plan is still set to be released in September.

Geography Update – Tristan Peter-Contesse reviewed with the Team a question about geography that had been raised earlier by the Team. Points and discussion included:

- There are differences between lead entities and Chinook Recovery Plan chapters, and the hope is to avoid those inconsistencies with the steelhead planning and implementation.
- Jen Burke at the Puget Sound Partnership (PSP) has been working through some information and has created a multi-layer map that overlays Chinook watersheds and populations with steelhead populations.
- The Chinook Major Population Groups (MPGs) are different than the steelhead MPGs. Additionally, there are 15 Chinook populations and 32 steelhead populations, so hardly does a Chinook and steelhead population line up (it gets pretty close in the West Sound and Nisqually, though).
- The important point for the Team to discuss at greater detail is how to best manage the various populations and their recovery. It would be good to prepare this for the Team to discuss soon (perhaps at the August work session). It was noted that the Team could start by preliminarily getting the watersheds' input about how to best deal with geography.

- It is important to have the steelhead Recovery Plan be a living document that people can use in an ongoing manner for project and strategy decisions – and whether that is used by existing policy bodies or we make new groups to address steelhead is yet to be determined.
- A Team member asked that the boundaries for Local Integrating Organizations be considered, too.
- Another Team member noted that Chinook and steelhead use rivers differently, so it is important that the policy bodies understand how the two species are different and how recovering them needs to have different strategies.
- The Team also discussed the difference between the Team's task to complete a regional Recovery Plan while the watersheds are tasked with identifying local recovery actions and strategies to fit with the regional plan.
- The Team also discussed when and how to designate primary stabilizing populations. It will be important to consider what the Technical Recovery Team identified for certain areas, and to also include diversity of life history in making those designations.

NetMap Update – Tristan Peter-Contesse also updated the Team on new information on NetMap, a modeling option that the Team has briefly discussed at previous meetings. Points and discussion included:

- PSP found that the Environmental Protection Agency (EPA) recently funded an effort to use NetMap in every watershed for about 50 attributes. Jen Burke with PSP is working through those attributes and assessing which would be most helpful to the Team's work.
- The hope by finding this data is that while some of the attributes may not be helpful, there might be several that will be great to share with the watersheds when asking for them to provide a watershed recovery chapter.
- The data is available in both hydrology layers and in narrative format (depending on the information).
- This work was from a direct grant awarded two or three years ago, and Lee Benda in Oregon did the work.

Workgroup Progress Reports – Each workgroup gave a brief update on the latest progress made.

Recovery Goals & Scenarios Workgroup

- This workgroup is primarily focused on developing the life cycle model. They hosted three workshops around the Puget Sound in late April and early May, and were really thrilled with the participation (about 70 unique participants across all three meetings).
- They got good feedback on the model, and a list of ideas to incorporate into the model. The workgroup will meet soon to sort through these ideas and identify how to make them specific tasks.

Stresses & Pressures Workgroup

- Ed Connor has developed an assessment of stresses, stressors, and pressures from various steelhead assessment documents. This assessment includes putting the information into the taxonomy preferred by other efforts in the Puget Sound.
- The goal is to work with the Watershed Template Workgroup soon to create a resource for watersheds using this stress/stressor/pressure information.

Watershed Template Workgroup

- The workgroup will use the information from Ed Connor's table to build out a "linkage library" that would help watersheds identify important components and the stresses/stressors/pressures affecting them.
- They have been finding a logical pathway between pressures and the effects on high and low flows.

Habitat Protection Plan Workgroup

- The workgroup is focused on the habitat protection plan part of the recovery plan, using broad-sense habitat protection strategies (not just habitat acquisitions, but incentive programs, planning at the local level, etc.).
- Scott Powell has started an outline and Tristan Peter-Contesse will soon refine that to match the Open Standards approach.

Marine Survival Research Project Update – Michael Schmidt and several other partners presented specific data and research projects to the Recovery Team. Each PowerPoint presentation is available for more details, but high-level points are included below.

Puget Sound Steelhead Research Activities (Michael Schmidt, Long Live the Kings)
Overview of Salish Sea Marine Survival Project:

- 40 partner organizations.
- 11 projects to understand marine mortality.
- Research activities included:
    - Assessing correlations between survival and ecosystem and fish characteristics,
    - Identifying locations, rate, and timing of mortality, and
    - Evaluating disease, toxic contaminants, genetics, and predator-prey interactions to reveal the direct and underlying causes of mortality.

Puget Sound and Washington Coast Steelhead Marine Survival: Trends and potentially related environmental variables (Neala Kendall, WDFW)

- Objectives included:
    - Confirm declining steelhead smolt survival trends (both hatchery and wild fish) over time in Puget Sound,
    - Compare these trends with other neighboring regions, including Washington coast and lower Columbia River, and
    - Relate these trends to environmental variables in Puget Sound and the ocean.
- Looked at 52 steelhead populations (hatchery or wild).
- The Puget Sound populations have been consistently lower than the Pacific Coast/Strait of Juan de Fuca and Lower Columbia River, which have recovered at a higher rate.
- Puget Sound wild steelhead smolt survival has declined over time, especially low since early 1990s.
- Within Puget Sound, south Sound and Hood Canal hatchery populations' SARs are lower than other regions.
- Puget Sound hatchery steelhead smolt survival has been lower than other regions, especially since 1995.
- Coastal upwelling and sea surface temperature are regionally significant environmental indicators for survival trends.

- Next steps:
    - Confirm hatchery SAR values, especially pre-1994,
    - Continue to gather indicator data to use in the modeling work, and
    - Continue modeling work.

Puget Sound Steelhead Smolt Reciprocal Transplant (Megan Moore, Northwest Fisheries Science Center)

- This project was intended to understand if hatchery rearing could lead to a shock when released in the marine environment.
- Puget Sound survival probabilities are low similar to previously calculated Puget Sound estimates.
- Population, river, translocation, and length factors did not help describe variation in survival.
- Release date was found to be a somewhat important predictor variable.
- Distance influenced some Puget Sound survival rates.
- Smolts from both the Green and Nisqually Rivers took a similar amount of time from release to the Strait of Juan de Fuca (about two weeks).

Harbor Seal – Steelhead Smolt Interactions in Puget Sound (Barry Berejikian, Northwest Fisheries Science Center)

- Objectives of this study:
    - Quantify "encounters" between steelhead smolts and harbor seals, including river-of-origin, timing of interactions, and locations.
    - Investigate evidence for predation, through either:
        - Direct evidence (recurring continuous pings on seal-mounted receivers), and/or
        - Indirect evidence (stationary tags associated with seal locations).
- Encounters between harbor seals and steelhead were found to be substantial (e.g., half of Nisqually smolts reaching central Puget Sound were detected).
- More migrating steelhead and stationary tags were detected in central Puget Sound than in Admiralty Inlet (more total detections and more detections per harbor seal).
- Seals provide tag locations for steelhead during and after the outmigration season (tag "behavior" and final locations allows for inferences regarding predation).
- No evidence of the "dinner bell" effect.
- Next steps: collect more data, especially in the south Sound.

Sea Lion Tagging at Bremerton & Everett (Steve Jeffries, WDFW)

- Tested the density of sea lions in the Puget Sound, including California sea lions (though typically only the male migrate north from California).
- Once sea lions were captured, tags were put on their backs to be re-collected after a period of time.
- Of the 16 sea lions with tags, only three stayed in the Puget Sound. The other 13 traveled along the Washington and Oregon coasts and/or around Vancouver Island. Many were following herring.
- Puget Sound sea lions dived a lot deeper than those along the coast.

Nanophyetus salmincola *in Outmigrating Puget Sound Steelhead* (Martin Chen, Northwest Indian Fisheries Commission)

- This study was intended to look for a correlation between the lower return of steelhead to South Sound rivers and the presence and intensity of *Nanophyetus salmincola* infection, as well as whether the intensity of the infection is influenced by outmigration and poor marine survival.
- *N. salmincola* occurs in both hatchery and wild steelhead.
- Most damage occurs in the first four days after initial infection.

Assessing the Threat of Toxic Contamination to Early Marine Survival of Steelhead Trout in the Salish Sea (Sandie O'Neill, WDFW)

- This study intended to look for how contaminated are out-migrant wild steelhead, and whether the contaminant levels are high enough to impact fish health and survival.
- The study tested for total polychlorinated biphenyls (TPCBs) and polybrominated diphenyl ethers (PBDEs).
- They found that overall contaminant concentrations are lower in steelhead compared to Chinook, except for PBDEs. PBDEs are particularly a concern in areas with a concentrated level of that contaminant.
- Future research will investigate sources of PBDEs in the Nisqually, evaluate physiological status of outmigrant fish (lipid content/classes), and investigate genomic measure of fish health.

Genome-Wide Association Study of Survival in Acoustically Tagged Steelhead Smolts in Puget Sound (Ken Warheit, WDFW)

- Looked for correlation between genotype and phenotype.
- Used DNA data from acoustic tags to find the fate of the fish.
- The fate of out-migrating steelhead smolts is not independent of their genomes.
- Two groups of genes appear to have significant association with survival: developmental and immunological.
- This may be influenced by the time of year and release location.
- Working hypothesis: smolts with certain alleles may be compromised by their immunological response.
- Predation may be the proximate cause of mortality, but ultimate cause may be fish health and presence of pathogen(s).
- Hope to look at the data again using a threshold standard.

Due to lack of time after the presentations, the Recovery Team agreed to hold a conference call before early August to discuss what they learned from the presenters and how this information can be used in the recovery planning process.

The meeting was adjourned at 3:00pm.

Participants:

Participant	Affiliation
Joe Anderson	Washington Department of Fish & Wildlife
Elizabeth Babcock	National Marine Fisheries Service
Barry Berejikian	Northwest Fisheries Science Center
Alan Chapman (phone)	Lummi Natural Resources
Martin Chen	Northwest Indian Fisheries Commission
Ed Connor	Seattle City Light
Ned Currence (phone)	Nooksack Tribe
Ken Currens	Northwest Indian Fisheries Commission
Jeanette Dorner	Puget Sound Partnership
Steve Jeffries	Washington Department of Fish & Wildlife
Thom Johnson (phone)	Point No Point Treaty Council
Neala Kendall	Washington Department of Fish & Wildlife
Matt Klungle	Washington Department of Fish & Wildlife
Steve Leider	National Marine Fisheries Service
Paul McCollum (phone)	Port Gamble S'Klallam Tribe
Megan Moore	Northwest Fisheries Science Center
Susan O'Neil	Long Live the Kings
Sandie O'Neill	Washington Department of Fish & Wildlife
Tristan Peter-Contesse	Puget Sound Partnership
Scott Powell	Seattle City Light
David Price	Washington Department of Fish & Wildlife
Michael Schmidt	Long Live the Kings
David Troutt	Nisqually Tribe
Ken Warheit	Washington Department of Fish & Wildlife
Claire Chase	Triangle Associates

Puget Sound Steelhead Recovery Team
July 28, 2015 Conference Call
Follow up to June 5, 2015 Meeting

Actions Items from Meeting

Action	Assignment
5. Establish a Marine Survival workgroup (MSWG)	Recovery Team to establish Workgroup
6. Follow up on Joe's 3 recommendations	MSWG
7. Determine authorities	MSWG
8. Develop a strong adaptive management approach before exploring predator control	MSWG
9. Meet with the Salish Sea research representatives on an as-needed basis as new information emerges, bring information to the Recovery Team	Neala and Joe

Welcome & Introductions – Bob Wheeler welcomed everyone to the call and had each participant share their name and group affiliation. Participants included Austin Thomas (DFW), Elizabeth Babcock (NWFS), Jeanette Dorner (PSP), Jed Moore (Nisqually Tribe), Jeff Hard (NOAA), Ken Currens (NWIFC), Martin Chen (NWIFC), Megan Moore (Northwest Fisheries Science Center), Michael Schmidt (LLTK), Neala Kendall (DFW), Scott Powell (SCL), Susan O'Neil (LLTK), Tristan Peter-Contesse (PSP), Bob Wheeler (Triangle Associates), and Claire Barrett (Triangle Associates).

The goals of the call were: (1) To debrief the presentations made at the June 5th Recovery Team meeting, (2) to discuss what marine survival research information should be folded into the steelhead recovery planning effort (including who and how), and (3) to identify any needs in establishing relationships or next steps to incorporate more marine survival research as it is analyzed.

Elizabeth expressed her appreciation for all members of the Salish Sea Marine Survival Resesarch Project. She expressed her goal for the call: to foster a continuing discussion that integrates the technical work into the recovery planning effort with a focus on determining what the group should do with the information while strengthening relationships.

Presentation Review & Next Steps: The opportunity was provided to review and ask questions of any of the seven presentations from June 5:

- Overview Presentation - Michael reviewed the "Steelhead Thought Process." Key discussion points included:
  - The research focus was developed by process of elimination based on characteristics of mortality, migration behavior, etc. The information now suggests that HABs, foraging/starvation, outmigrant size/growth, outmigrant timing, and habitat modifications are not primary areas of interest now (though length, weight and stomach content data is available for analysis).
  - Scott and Tristan clarified that the real question has to do with marine vs fresh water focus and how that relates to the Recovery Team, and since marine survival appears to be so critical is there a need to focus on freshwater concerns as well.
  - Michael clarified that there was a marine focus simply because the guiding question of the research group has to do with 'Why fish are dying in Puget Sound'.

- It was noted that some of the Recovery Team will be looking at both fresh water habitat concerns and Puget Sound findings. For example, freshwater habitat is still critical and needs an equal focus, and the life cycle model will hopefully build context for these pieces.

- Steps to incorporate this information into the Recovery Team?
  - Neala shared an email from Joe Anderson that outlined three possible steps:
    1) If the marine survival research can identify specific predator(s) that have a measurably large impact on steelhead survival, consider a multi-species management approach in the recovery plan. This arena is fraught with potential conflicts, particularly if the predator(s) are also protected. A recent paper provides some biological background and summarizes policy options in these situations.
       - It was noted that in order to carry out this recommendation, it is important to determine who has the authority for such an action.
    2) If we learn that additional factors contribute to high marine mortality (e.g., disease), identify means to reduce their impacts. Even in cases where predation is the proximate cause of mortality, conditions experienced in freshwater may increase steelhead vulnerability to marine predators. If this is the case, efforts to understand when/where/how vulnerability is increased might allow us to implement actions intended to improve marine survival.
    3) Prioritize monitoring of total marine survival (i.e., smolt to adult return rate). Unfortunately, there are precious few locations in Puget Sound where we monitor total marine survival, mostly in small creeks or tributaries of larger rivers. It is likely that learning more about patterns and variation in survival from smolt outmigration to adult return is crucial to our ability to recover the species.

  - Should these recommendations be incorporated into the Recovery Plan?
    - The Recovery Team agreed to include this information in the Marine Survival chapter of the Recovery Plan.
    - How do we set up a collaborative structure to include not only current findings but future findings as they are available, and how can the Salish Sea project work be incorporated into the Marine Survival chapter?
      - This is built into the Recovery Goals & Scenarios Workgroup already as Neala and Joe are on that as well as the Salish Sea project and can communicate progress to the Recovery Team.
    - Michael: Explained that his task as the facilitator of the Marine Survival Workgroup is to produce summaries of the work. The group is finalizing a scope for future work in the next few months. Michael indicated the Salish Sea group would appreciate Recovery Team's review and comment.
- Summary of discussion items up to this point:
  - Joe's 3 points are important and should be considered and incorporated into the recovery planning effort.
  - Authority for determining predator control actions needs to be determined.
  - Predator control efforts necessitate a strong adaptive management approach.
  - Instead of regular calls or meeting to update the team, as needed updates can be scheduled based on research field seasons and new information. Furthermore, Neala and Joe can serve as ambassadors between the two groups.

    - A separate Marine Survival workgroup should be established or appointed by the recovery team sooner rather than later.

- In order to start developing the Marine Survival chapter of the Recovery Plan, the Team discussed:
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    - A group can start writing the introduction (the background is already written), the rest is dependent on how the work plan is developed. The first phase is more about figuring out what questions to ask.
    - A Team member added that linking the common framework and the different pieces of what we are working on can be done by using Open Standards. The building blocks and conceptualization of how to use this as a planning tool will be clearer in August at the retreat. It would be good to have next steps for the groups.
    - Elizabeth: Workgroup would build off what Neala has been working on and begin structuring what the chapter would look like including pulling boilerplate language from other documents.
- The work plan is still being developed. The research planning is still fluid also. It was noted that this is a difficult process with limited resources, and the Recovery Team was encouraged to provide feedback as appropriate throughout the process.

The call adjourned at 2:15 pm.